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**Amendments to the Specification:**

Please replace the TITLE with the following rewritten TITLE:

--METHOD FOR ISOLATING A HYBRID DEVICE IN AN IMAGE SENSOR--

Please replace the section heading at page 1, line 3 with the following rewritten section heading:

--Technical Field of the Invention--

Please replace the paragraph at page 1, lines 5-8 with the following rewritten paragraph:

--The present ~~invention~~ disclosure relates to an image sensor[[:]] and, more particularly, to an image sensor capable of ~~decreasing a~~ reducing the generation of dark current ~~generation through the use of~~ by using a hybrid device isolation process.--

Please replace the paragraph at page 1, lines 12-24 with the following rewritten paragraph:

--Generally, an image sensor is a semiconductor device that ~~converts~~ changes an optical image into [[an]] electrical signals. ~~Particularly, a charge-coupled~~ A charge-coupled device (CCD) is a device ~~wherein an~~ in which individual metal-oxide-silicon (MOS) capacitors ~~is closely allocated~~ are located close to each other[[:]]. ~~and an electrical~~ Electric charge carriers [[is]] are stored at the capacitors and transferred to the MOS capacitor. transmitted through the capacitors. A complementary metal-oxide semiconductor device (CMOS) image sensor is a device ~~that forms~~ constructed from as many MOS transistors as the same number of pixels, ~~and adopts a switching mode for sequentially detecting outputs with use of the MOS transistors~~ The CMOS image sensor uses a switching scheme to detect image outputs sequentially using the MOS transistors by employing CMOS technology, and using a control circuit and a signal processing circuit as periphery circuits.--

Please replace the paragraph beginning at page 1, line 25 and ending at page 2, line 15 with the following rewritten paragraph:

~~--However, there~~ There are several problems ~~[[of]] associated with~~ using ~~[[the]] a~~ CCD due to its complex driving mode, high power dissipation, ~~[[a]] complex~~ fabrication process having ~~lots of~~ several steps for ~~[[a]] the mask process processes,~~ and ~~[[a]] its~~ difficulty in ~~one-chip realization~~ being realized on one chip since ~~[[the]] signal processing circuit~~ circuitry cannot be constructed directly on ~~[[a]] the~~ CCD chip. Therefore, there has been ~~actively researched on the~~ active research related to a CMOS image sensor that uses sub-micron CMOS technology to overcome the ~~above~~ problems~~[[.]] noted above.~~ ~~[[The]] A~~ CMOS image sensor obtains an image by forming a photodiode and a MOS transistor within a unit pixel and then uses a switching mode to sequentially ~~detecting~~ detect signals, ~~through a switching mode.~~ The use of ~~[[the]] CMOS technology~~ results in less power dissipation and ~~an-enabled~~ enables the signal processing circuitry to be located on one chip. ~~one-chip process for the signal processing circuit.~~ Also, compared to the CCD process, ~~that which~~ requires approximately 30 to 40 masks, ~~[[the]] a~~ CMOS image sensor implemented with ~~[[the]] CMOS technology~~ is a simplified process that needs approximately 20 masks, ~~because of a simplified process.~~ ~~Hence,~~ Therefore, the CMOS~~[[,]]~~ image sensor is currently highlighted as a next generation image sensor.--

Please replace the paragraph at page 2, lines 16-19 with the following rewritten paragraph:

--In a typical image sensor, dark ~~currents are~~ current is produced more easily, resulting in a decrease~~[[s]]~~ in function and capability of the image sensor ~~storing to store~~ charges. ~~More~~ A more detailed explanation ~~on the of~~ dark current will be provided ~~in the following.~~ below.--

Please replace the paragraph at page 2, lines 20-26 with the following rewritten paragraph:

--Electrons~~[[,]]~~ that move to a floating diffusion region from a photodiode~~[[,]]~~ may produce dark current~~[[s]]~~ even in ~~[[an]] the~~ absence of light. Particularly, ~~[[the]] dark currents are~~ current is caused by a dangling bond or various defects, such as a line defect, a point defect and so forth, that mainly exist in the edges of an activation region. Such dark current may cause severe problems in a ~~low-illumination~~ low-illumination environment.--

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Please replace the paragraph at page 3, lines 1-5 with the following rewritten paragraph:

--In a CMOS image sensor ~~to which a technology of providing~~ having a device line-width of about 0.35  $\mu\text{m}$  or about 0.25  $\mu\text{m}$ , as ~~[[an]]~~ the area of ~~[[a]]~~ the photodiode ~~region~~ decreases, a ratio of ~~[[a]]~~ the perimeter of the photodiode ~~region~~ with respect to the area of the photodiode ~~region~~ decreases as well.--

Please replace the paragraph at page 3, lines 6-14 with the following rewritten paragraph:

--~~The above feature is illustrated in FIG. 1.~~ Referring to FIG. 1, since three surfaces of the photodiode, except for ~~[[a]]~~ the surface in which a transfer transistor will be formed, are ~~touched to a~~ in contact with the field insulation layer, the photodiode is affected ~~in more~~ extents by the same defects generated at the edges of the ~~filed~~ field insulation layer as the photodiode area decreases due to micronization. ~~of a device. Herein, the~~ The perimeter of the photodiode is calculated ~~by taking~~ using only the three surfaces ~~touching to~~ in contact with the ~~filed~~ field insulation layer.--

Please replace the paragraph at page 3, lines 15-19 with the following rewritten paragraph:

--This effect of increasing dark current generation~~[[s]]~~ with respect to an image signal is pronounced as ~~[[a]]~~ the minimum device line-width, e.g., about 0.25  $\mu\text{m}$  or 0.18  $\mu\text{m}$ , decreases. In other words, ~~such a~~ CMOS image sensor with an ultra fine line-width more easily causes ~~[[the]]~~ dark current.--

Please replace the section heading at page 3, line 21 with the following rewritten section heading:

--Summary of the Invention--

Please replace the paragraph at page 3, lines 23-27 with the following rewritten paragraph:

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~~--It is, therefore, an object of the present invention to provide a A method for isolating a hybrid device in an image sensor through an improvement on a by improving dark current characteristics even if ~~[[an]]~~ the area of ~~[[a]]~~ the photodiode region decreases. is reduced is disclosed.--~~

Please replace the paragraph at page 4, lines 1-17 with the following rewritten paragraph:

~~--In accordance with an aspect of the present invention, disclosure, there is provided a method for isolating a hybrid device in an image sensor includes: including a photodiode, the method including the steps of: forming sequentially a pad oxide layer and a pad nitride layer on a substrate and selectively removing a portion of the pad oxide layer and a first portion of the pad nitride layer to expose a surface of the substrate ~~[[in]]~~ on which a field insulation layer will be formed; forming ~~the field insulation layer~~ a first ion-implantation region by performing a ~~channel stop~~ first ion-implantation process ~~[[to]]~~ on the exposed surface of the substrate ~~with use of~~ using the remaining pad nitride layer that exists after removal of the first portion of the pad nitride layer as a first mask; performing a thermal oxidation process to form the field insulation layer on the exposed surface of the substrate; removing a ~~partial~~ second portion of the pad nitride layer so that ~~[[one]]~~ a side of the remaining pad nitride layer that exists after removal of the second portion of the pad nitride layer is spaced ~~out with a predetermined distance from an edge of the field insulation layer;~~ apart from an edge of the field insulation layer by a distance; and forming a second ion-implantation region by performing an additional a second ion-implantation process onto on the exposed substrate surface and the field insulation layer ~~[[by]]~~ using the remaining pad nitride layer that exists after removal of the second portion of the pad nitride layer as a second mask.--~~

Please replace the paragraph at page 4, lines 21-24 with the following rewritten paragraph:

~~--The above and other objects and features of the present invention will become apparent from the following description of the preferred embodiments given taken in conjunction with the accompanying drawings, in which:--~~

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Please replace the paragraph at page 5, lines 1-4 with the following rewritten paragraph:

--FIGS. 2A to 2D are cross-sectional views showing a hybrid device isolation ~~process~~ region in an image sensor in accordance with a ~~preferred one~~ embodiment; ~~of the present invention~~;

Please replace the paragraph at page 5, lines 5-7 with the following rewritten paragraph:

--FIG. 3 is a cross-sectional view showing a device isolation ~~process~~ with region having a trench structure in accordance ~~[[with-another]]~~ with another preferred embodiment; ~~of the present invention~~;

Please replace the paragraph at page 5, lines 8-12 with the following rewritten paragraph:

--FIG. 4A is a plane view showing a layout of a photodiode and a transfer transistor in a unit pixel of a complementary metal-oxide semiconductor (CMOS) image sensor in accordance with yet another preferred embodiment; ~~of the present invention~~; and--

Please replace the paragraph at page 5, lines 13-17 with the following rewritten paragraph:

--FIG. 4B is a cross-sectional view with respect to a line A-A' of FIG. 4A illustrating the photodiode and the transfer transistor in the unit pixel of the CMOS image sensor, ~~formed in accordance with the above preferred embodiment of the present invention~~.--

Please replace the section heading at page 5, line 19 with the following rewritten section heading:

--Detailed Description ~~of the Invention~~--

Please delete the paragraph at page 5, lines 21-23.

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Please replace the paragraph beginning at page 5, line 24 and ending at page 6, line 5 with the following rewritten paragraph:

--Referring to FIG. 2A, a pad oxide layer 11, a pad nitride layer 12 and a photosensitive layer 13, which will be used as a device isolation mask in subsequent processes, are sequentially formed on a substrate 10. Then, a device isolation mask process is performed ~~[[to]]~~ on a region of the substrate 10 where a field insulation layer will be formed. ~~In the present invention, the~~ The substrate 10 can use a stack structure ~~wherein~~ in which an epitaxial layer with a low concentration is deposited on a silicon layer with a high concentration:--

Please replace the paragraph at page 6, lines 6-10 with the following rewritten paragraph:

--~~The reason for using the~~ lowly concentrated epitaxial layer is used because it is possible to improve device properties by increasing ~~[[a]]~~ the depth of ~~[[a]]~~ the depletion layer of ~~[[a]]~~ the photodiode, ~~[[and]]~~ as well as to prevent ~~a cross talk phenomenon~~ cross talk between unit pixels in a substrate with a high concentration.--

Please replace the paragraph at page 6, lines 11-15 with the following rewritten paragraph:

--Referring to FIG. 2B, the pad nitride layer 12 and the pad oxide layer 11 are etched ~~with use of~~ using the device isolation mask 13 ~~so as to~~ expose a surface of the substrate 10 ~~[[in]]~~ on which the field insulation layer will be formed. The device isolation mask 13 is removed ~~thereafter~~. after the pad nitride layer 12 and the pad oxide layer 11 have been etched.--

Please replace the paragraph at page 6, lines 16-24 with the following rewritten paragraph:

--Next, a channel stop ~~ion-implantation~~ ion-implantation process is performed to the surface of the substrate 10 by using the ~~exposed~~ etched pad nitride layer 12 as an ion-implantation mask ~~so as to~~ form a channel stop ion-implantation region 100. For the channel

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stop ion-implantation process, the ion-implantation concentration of boron is about  $3.0 \times 10^{13} \text{ cm}^{-3}$  and the ion-implantation energy is about  $3.0 \times 10^{13} \text{ eV}$  and about 30 keV, respectively. The above channel stop ion-implantation process is proceeded carried out without giving specifying a tilt angle and a rotation angle.--

Please replace the paragraph beginning at page 6, line 25 and ending at page 7, line 7 with the following rewritten paragraph:

--With reference to FIG. 2C, the surface of the substrate 10 completed with after the channel stop ion-implantation process is completed, is then proceeded with a thermal oxidation process is performed so as to grow form the field insulation layer, particularly, e.g., a field oxide layer (Fox) on the surface of the exposed substrate 10. On the pad nitride layer 12, a photosensitive pattern 14 is subsequently formed on the pad nitride layer 12 to etch the pad nitride layer 12 with so that a side of the pad nitride layer 12 is spaced apart a predetermined distance X from an edge of the Fox by a predetermined distance X. At this time, the The predetermined distance X preferably ranges from about 0.5  $\mu\text{m}$  to about 1.0  $\mu\text{m}$ .--

Please replace the paragraph at page 7, lines 8-13 with the following rewritten paragraph:

--With reference to FIG. 2D, the pad nitride layer 12 is etched with so that a side of the pad nitride layer 12 is spaced apart the predetermined distance X from the edge of the Fox by the predetermined distance X by using the photosensitive pattern 14 as an etch mask. Subsequently, a boron ion-implantation process is performed on the Fox by using the etched pad nitride layer 12 as an ion-implantation mask.--

Please replace the paragraph at page 7, lines 14-20 with the following rewritten paragraph:

--At this time, the The boron ion-implantation process can be carried out under the same conditions as the channel stop ion-implantation process. Alternatively, the boron ion-implantation process can be carried out using a boron concentration

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ranging from about  $4.0 \times 10^{13} \text{ cm}^{-3}$  to about  $5.0 \times 10^{13} \text{ cm}^{-3}$ . Such an optimal dosing concentration is determined after receiving  $[[a]]$  feedback information about  $[[a]]$  dark current characteristics.--

Please replace the paragraph at page 7, lines 21-27 with the following rewritten paragraph:

--Referring to FIG. 2D, ~~denoted numerical symbols,  $\oplus$  and  $\ominus$ , represent~~ the numerical symbol "1" enclosed in a circle represents the channel stop ion-implantation region 100 formed by the channel stop ion-implantation process, and the numerical symbol "2" enclosed in a circle represents a boron ion-implantation region 50 additionally formed through by the boron ion-implantation ion-implantation process $[[.]]$ , respectively. Also, as shown, ~~the~~ The photosensitive pattern 14 is removed after completing the ~~additional~~ boron ion-implantation process $[[.]]$  is performed.--

Please replace the paragraph at page 8, lines 1-7 with the following rewritten paragraph:

--In accordance with the preferred one embodiment, ~~of the present invention,~~ the boron ion-implantation region 50 ~~screens~~ encompasses the edges of the Fox, thereby improving  $[[the]]$  dark current characteristics. ~~That is,~~ In other words, electrons generated at the edges of the Fox ~~are disappeared through an~~ disappear by electron-hole ~~electron-hole~~ pair recombination, ~~phenomenon~~ which occurs at the boron ion-implantation region 50.--

Please replace the paragraph at page 8, lines 8-12 with the following rewritten paragraph:

--FIG. 3 is a ~~plane~~ cross-sectional view showing a device isolation ~~process with~~ region having a trench structure in accordance with another preferred embodiment, ~~of the present invention.~~ As with FIG. 2D, a  $[[A]]$  channel stop ion-implantation region  $[[\oplus]]$  is represented by the numerical symbol "1" enclosed in a circle, and a boron ion-implantation region  $[[\ominus]]$  is represented by the numerical symbol "2" enclosed in a circle ~~are illustrated in~~ FIG. 3.--



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Please delete the paragraph at page 8, lines 13-15.

Please replace the paragraph at page 8, lines 16-26 with the following rewritten paragraph:

--Referring to FIG. 3, a process for forming a device isolation region having a trench structure is described. A buffer oxide layer (not shown) and a pad nitride layer (not shown) are sequentially deposited on a substrate 20. ~~Then, a~~ A device isolation mask is then used to selectively etch the buffer oxide layer and the pad nitride layer so that a region[[,]] in which a trench will be formed[[,]] is exposed. Afterwards, the trench is formed [[on]] in the substrate 20 ~~with use of by an etch process using the pad nitride layer as an etch mask. Subsequent to~~ After the trench formation, an oxide layer is formed in an inner wall of the trench ~~in order to compensate for damages of damage to the inner wall of the trench that occurs when proceeding occurred during the etch process. for forming the trench.~~

Please replace the paragraph beginning at page 8, line 27 and ending at page 9, line 8 with the following rewritten paragraph:

--Next, a channel stop ion-implantation process is performed to form the channel stop ion-implantation region, [[⊙] ] which is represented by the numerical symbol "1" enclosed in a circle in FIG. 3, and ~~bury an insulation material 21 is deposited in the trench. with an insulation material 21.~~ The insulation material 21 in the trench is planarized ~~through by a~~ chemical mechanical polishing (CMP) process, and ~~then,~~ a predetermined portion of the pad nitride layer is then etched ~~in such a manner so~~ that one side of the pad nitride layer is spaced ~~out with a predetermined distance apart from an edge of the insulation material 21[[,]] by a predetermined distance.~~

Please replace the paragraph at page 9, lines 9-16 with the following rewritten paragraph:

--After the ~~above~~ etching process, a boron ion-implantation process is ~~additionally~~ performed by using the pad nitride layer as an ion-implantation mask ~~so as to form a boron ion-implantation region, [[⊙] ]~~ which is represented by the numerical symbol "2" enclosed in

~~a circle in FIG. 3. on the exposed substrate 20 and the insulation material 21. The pad nitride layer is removed thereafter, whereby the~~ and a device isolation region with having a shallow trench isolation structure is ~~completely~~ formed.--

Please replace the paragraph at page 9, lines 17-21 with the following rewritten paragraph:

--In addition to a typical device isolation process with using a local oxidation of silicon (LOCOS) structure, the present ~~invention~~ disclosure can ~~[[be]]~~ also be applied to a device isolation process with using a trench structure or a poly buffered locos (PBL) process.-

Please replace the paragraph beginning at page 9, line 22 and ending at page 10, line 10 with the following rewritten paragraph:

--FIG. 4A is a plane view showing a layout of a photodiode and a transfer transistor in a unit pixel of a complementary metal-oxide semiconductor (CMOS) image sensor ~~formed~~ in accordance with another ~~preferred embodiment of the present invention. Especially, a~~ A boron doping profile is formed by being spaced out with a predetermined distance in a photodiode region contacting to from a Fox (not shown). A boron ion-implantation region additionally ion-implanted encompasses encompasses the edges of the Fox[[.]] and, therefore, this fact provides an effect of decreasing reduces dark current[[s]] even if an n-type ion-implantation region ~~for a~~ of the photodiode is not decreased reduced to a size to fit within ~~[[a]] the dotted boundary[[.]] shown in FIG. 4A.~~ It is also possible to prevent a decrease reduction of saturation current[[s]] since it is not necessarily required that the n-type ion-implantation region ~~[[for]] of the photodiode is not necessarily required to be decreased for improving the~~ be reduced to improve dark current characteristics.--

Please replace the paragraph at page 10, lines 11-13 with the following rewritten paragraph:

--FIG. 4B is a cross-sectional view showing the photodiode region and the transfer transistor ~~from a viewpoint of~~ with respect to the ~~[[A-A']]~~ line A-A' shown in FIG. 4A.--

Please replace the paragraph beginning at page 10, line 14 and ending at page 11, line 4 with the following rewritten paragraph:

--The structure ~~shown~~ illustrated in FIG. 4B includes a Fox layer 31 formed on a substrate 30, a channel stop ion-implantation region 32A formed on ~~[[a]]~~ the bottom of the Fox layer 31, a boron ion-implantation region 32B ~~extended with~~ extending a predetermined distance from an edge of the Fox layer 31, an n-type ion-implantation region 34 ~~for a~~ of the photodiode formed within the substrate 30 and ~~contacted to~~ in contact with one side of the Fox layer 31, a spacer 35 formed on lateral sides of a gate electrode 33 of the transfer transistor, a p-type ion-implantation region 36 for ~~[[a]]~~ the photodiode formed in between ~~[[a]]~~ the surface of the substrate 30 and the n-type ion-implantation region 34 for the photodiode, and a floating diffusion region 37 formed on the other side of the p-type ion-implantation region 36 for the photodiode and the transfer transistor. ~~Herein, one~~ One side of the p-type ion-implantation ~~ion-implantation~~ region 36 for the photodiode is ~~contacted to~~ in contact with the spacer 35 and the other side ~~of the p-type ion-implantation region 36 of the photodiode is in contact with~~ is contacted to the boron ion-implantation region 32B.--

Please replace the paragraph at page 11, lines 5-9 with the following rewritten paragraph:

--As ~~shown,~~ illustrated in FIG. 4B, the boron ion-implantation region 32B ~~extended with the~~ extends a predetermined distance from an edge of the Fox layer 31 ~~and encompasses~~ screens the edge of the Fox layer 31~~[[,]]~~, ~~and this~~ This encompassing action suppresses dark current~~[[s]]~~ generated ~~from~~ at the edge of the Fox layer.--

Please replace the paragraph at page 11, lines 10-18 with the following rewritten paragraph:

--~~In case of implementing this inventive method to an image sensor, it~~ It is possible to improve ~~[[the]]~~ dark current characteristics even in a micronized structure ~~through the use of~~ by using this hybrid device isolation technique. Also, ~~[[a]]~~ it is not necessarily required that the photodiode region ~~is not necessarily required to be decreased~~ reduced to ~~make an~~ improvement on the improve dark current characteristics. Therefore, it is possible to obtain a

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clearer and well-defined image since saturation currents can ~~[[be]]~~ also be decreased.  
reduced.--

Please replace the paragraph at page 11, lines 19-23 with the following rewritten paragraph:

--While the present ~~invention~~ disclosure has been described with respect to certain preferred embodiments, it will be apparent to those skilled in the art that various changes and modifications may be made without departing from the scope of the ~~invention~~ disclosure as defined in the following claims.--